Lloyd's Register

Rules and Regulations for the Classification of Naval Ships, January 2013

Notice No. 4

Effective Date of Latest Amendments:

See page 1

Issue date: November 2013

RULES AND REGULATIONS FOR THE CLASSIFICATION OF NAVAL SHIPS, *January 2013*

Notice No. 4

This Notice contains amendments within the following Sections of the *Rules and Regulations for the Classification of Naval Ships, January 2013.* The amendments are effective on the dates shown:

Volume	*Part*	*Chapter*	*Section*	*Effective date*
1	1	2	3	1 January 2014
1	3	2	3, 4	1 January 2014
1	3	4	1, 2, 4, 8	1 January 2014
1	3	5	10	1 January 2014
1	3	6	7	1 January 2014
1	5	1	2	1 January 2014
1	5	3	2	1 January 2014
1	6	2	3	1 January 2014
1	6	6	2	1 January 2014
2	7	2	3	1 January 2014
3	1	1	2	1 January 2014
3	1	6	1, 2	1 January 2013
3	3	2	1	1 January 2014
3	3	3	1	1 January 2014
3	3	4	1	1 January 2014

It will be noted that the amendments also include corrigenda, which are effective from the date of this Notice.

The *Rules and Regulations for the Classification of Naval Ships, January 2013* are to be read in conjunction with this Notice No. 4. The status of the Rules is now:

Rules for Naval Ships	Effective date:	January 2013
Notice No. 1	Effective date:	1 July 2013
Notice No. 2	Effective date:	1 January 2014
Notice No. 3	Effective date:	1 January 2014
Notice No. 4	Effective date:	1 January 2014

Volume 1, Part 1, Chapter 2
Classification Regulations

Effective date 1 January 2014

■ *Section 3*
Character of Classification and Class notations

3.7 Military Distinction notations

(*Part only shown*)

Table 2.3.1 Hull, Military and Other Class Notations

Mandatory Notations		Other Notations		
Ship Type	Service Area	Hull Strength	Military Distinction ✠ MD	Others
See 3.4 (Select one:)	*See* 3.5 (Select one:)	*See* 3.6	*See* 3.7	**PCWBT** Protective Coating in Water Ballast Tanks **ShipRight ACS (B)** Anti-Corrosion System in Water Ballast Tanks ***IWS** In-water Survey **SMS** Safety Management System

3.9 Other notations

3.9.20 **ShipRight ACS (B)**. This notation will be assigned to Naval vessels, at the Owner's request, when protective coating systems have been applied to water ballast tanks during construction in accordance with the *ShipRight Anti-Corrosion Notations for Naval Ships* procedure.

Existing paragraphs 3.9.20 *to* 3.9.22 *have been renumbered* 3.9.21 *to* 3.9.23.

3.9.24 **SMS** (Safety Management System). This notation will be assigned to a Naval Vessel where the safety management and operational procedures have been implemented, assessed and accepted by LR. The safety management and operational procedures are to incorporate objectives and requirements of the *International Safety Management Code* (ISM Code). This notation provides support in demonstrating that a Naval Vessel has a functioning Safety Management System in place, as required by the *ANEP-77 NATO Naval Ship Code* (NSC) and equivalent standards.

Volume 1, Part 3, Chapter 2
Ship Design

Effective date 1 January 2014

■ *Section 3*
Main hull structure

3.7 Deck structure

3.7.17 For flight decks, consideration should be given to the effect on fatigue life of welding attachments (e.g., cable trays and piping brackets) directly to the deck plating or stiffeners. It is recommended that attachments be made by other means or that the effect be accounted for in any fatigue analysis which may be undertaken.

Existing paragraphs 3.7.17 *to* 3.7.20 *have been renumbered* 3.7.18 *to* 3.7.21.

~~*3.7.21*~~ *3.7.22* Pipe or cable runs through watertight decks are to be kept to a minimum and are to be fitted with suitable watertight glands of a type, approved and pressure tested for the maximum head of water indicated by any required damage stability calculations.

Existing paragraph 3.7.22 *has been renumbered* 3.7.23.

~~*3.7.23* Doors and hatches fitted in watertight decks are to be of equivalent construction to the deck in which they are fitted, be permanently attached and capable of being closed watertight from both sides of the deck except for access to high security areas such as magazines or to prevent access from open decks as agreed with the Naval Authority. They are to be tested watertight in accordance with the LR survey procedures.~~

3.7.24 Heat-sensitive materials are not to be used in pipe or cable runs which penetrate watertight decks, where deterioration of such systems in the event of fire would impair the watertight integrity of the deck.

3.7.25 The number of openings in watertight decks is to be reduced to the minimum compatible with the design and proper working of the ship. Where openings are permitted in watertight decks, they are to be provided with suitable closing devices in accordance with Ch 4,4.

■ *Section 4*
Bulkhead arrangements

4.1 General

4.1.2 ~~Certain openings below the deck given in 4.1.1 may be permitted by the relevant stability and subdivision standard, but these must be kept to a minimum and provided with means of closing to watertight standards.~~ Where permitted by the stability and subdivision standard, certain openings below the deck described in 4.1.1 may be allowed, *see* Vol 1, Pt 1, Ch 2,1.1.9. In all cases these openings must be kept to a minimum and provided with means of closing to watertight standards.

~~*4.1.3* No accesses are to be fitted in collision bulkheads. In particular designs where it would be impracticable to arrange access to the fore peak other than through the collision bulkhead, access may be permitted if acceptable to the Naval Authority. Where accesses are provided, the openings are to be as small as practicable and positioned as far above the design waterline as possible. In such cases access is to be by manholes with closely spaced bolts situated as high as possible above the design waterline and, in any event, no lower than the damage control deck.~~

~~*4.1.4*~~ *4.1.3* The number of openings in watertight bulkheads is to be reduced to the minimum compatible with the design and proper working of the ship. Where openings are permitted in bulkheads they are to be provided with suitable closing devices in accordance with ~~Ch 4,7~~ Ch 4,4.

Existing paragraph 4.1.5 *has been renumbered* 4.1.4.

~~*4.1.6*~~ *4.1.5* Pipe or cable runs through watertight bulkheads are to be kept to a minimum and are to be fitted with suitable watertight glands of a type, approved and pressure tested for the maximum head of water indicated by any required damage stability calculations.

Existing paragraph 4.1.7 *has been renumbered* 4.1.6.

4.1.7 Heat-sensitive materials are not to be used in pipe or cable runs which penetrate watertight bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the deck.

4.3 Collision bulkheads

4.3.3 No accesses or ventilation ducts are to be fitted in collision bulkheads. In particular designs where it would be impracticable to arrange access to the fore peak other than through the collision bulkhead, access may be permitted if acceptable to the Naval Administration. Where accesses are provided, the openings are to be as small as practicable and positioned as far above the design waterline as possible, in any event, no lower than the damage control deck. Access is to be by manholes with bolts spaced at a watertight pitch.

4.3.4 Pipe runs or cable runs are only to be fitted in the collision bulkhead where approved by the Naval Administration.

4.6 Watertight recesses, flats, openings and loading ramps

~~*4.6.3* Doors and hatches fitted through watertight bulkheads are to be of equivalent construction to the bulkhead in which they are fitted, be permanently attached and capable of being closed watertight from both sides of the bulkhead. They are to be tested watertight in accordance with the LR Survey Procedures.~~

Existing paragraph 4.6.4 *has been renumbered* 4.6.3.

~~*4.6.5* Doors, manholes, permanent access openings or ventilation ducts are not to be cut in the collision bulkhead except as provided for in 4.1.3.~~

Existing paragraph 4.6.6 *has been renumbered* 4.6.4.

~~**4.7 Watertight doors and hatches in watertight subdivision boundaries below the vertical extent of watertight integrity**~~

~~*4.7.1* Watertight doors and hatches are to be constructed under survey and surveyed during installation. Doors are to be capable of being operated when the ship is listed up to 15° either way. Doors and hatches are to be operated under working conditions and tested in place, *see* Pt 6, Ch 6.~~

~~*4.7.2* Where watertight doors of the sliding type are permitted to be fitted by the Naval Authority, they are to be capable of being operated by efficient hand operated gear, both at the door itself and from an accessible position above the vertical limit of watertight integrity. Means are to be provided at all the remote operating positions to indicate whether the door is open or closed. Power operated doors are to be capable of being remotely closed from the appropriate control station.~~

~~*4.7.3* Where the doors and hatches are fitted in watertight subdivision boundaries they are to be of equivalent strength to the unpierced division and capable of being closed watertight. Watertight doors and hatches are to be of a type, approved and pressure tested from both sides for the maximum head of water indicated by any required damage stability calculations.~~

~~*4.7.4* Indicators are to be provided on the bridge, ship command centre or operations room showing whether the doors and hatches are open or closed.~~

~~*4.7.5* Watertight doors and hatches are to be capable of being operated from both sides of the watertight division. Power operated doors are to be capable of being opened and closed locally by both power and efficient hand operated mechanisms.~~

~~*4.7.6* As an alternative to sliding doors, special consideration will be given to the fitting of hinged watertight doors where it can be shown that they are as effective as the sliding type. Unless watertight doors are of the sliding type, a suitable system is to be installed to ensure that such doors remain closed when operating at an increased risk of collision or grounding.~~

~~*4.7.7* Doors are to be manufactured in accordance with a National Standard and tested following installation, see Pt 6, Ch 6.~~

Existing sub-Sections 4.8 *to* 4.13 *have been renumbered* 4.7 *to* 4.12.

Volume 1, Part 3, Chapter 4
Closing Arrangements and Outfit

Effective date 1 January 2014

■ *Section 1* Introduction

1.1 General

Existing paragraph 1.1.2 *has been renumbered* 2.5.1.

~~*1.1.3*~~ *1.1.2* Provisions covering acceptable arrangements for the watertight and weathertight integrity of the hull and spaces within the hull are to be read in conjunction with the limits defined in Ch 1,1.3. ~~For watertight doors and hatches in watertight subdivision boundaries below the vertical extent of watertight integrity, see Ch 2,4.7~~.

~~*1.1.4*~~ *1.1.3* Requirements are given for watertight and weathertight steel hatches and doors, securing arrangements, coamings, also closing arrangements for other miscellaneous openings, ventilators, air pipes, magazine blow out plates, discharges and outfit. For side shell doors for main opening and bow doors, *see* Pt 4, Ch 3.

Existing paragraphs 1.1.5 *and* 1.1.6 *have been renumbered* 1.1.4 *and* 1.1.5.

■ *Section 2*
Hatches and miscellaneous openings on the weather deck

2.1 Hatch covers

2.1.6 Small hatches, including escape hatches, are to be situated clear of RADHAZ areas and RAS stores receiving areas and storing routes. Small hatches and their securing devices are to be easily operable by one person. Where necessary, counterbalance weights, springs or other equivalent mechanisms are to be provided to assist the user in opening and closing the hatch. Any mechanism fitted is to be designed so as not to present a hazard to persons using the hatch. Failure of the mechanism is not to prevent the operation of the hatch.

2.5 Openings on the tops and sides of enclosed structures on the weather deck

~~*1.1.2*~~ *2.5.1* ~~The requirements of this Chapter are applicable to all openings on the weather deck.~~ Openings on the tops and sides of enclosed structures on the weather deck up to a height of 2,5 m are to be weathertight. In the forward $0{,}25L_R$ the height should be taken to 5 m. The height of openings may be required to be increased where this is shown necessary by the stability and watertight subdivision calculation required by Pt 1, ~~Ch 1,1.1~~ Ch 2,1.1. The weather deck as defined in Ch 1,5.4.2 may be stepped or recessed for the purpose of this Chapter. Special consideration will be given to the position of the weather deck of NS1 ship types.

Existing sub-Section 2.5 *has been renumbered* 2.6.

■ *Section 4*
Watertight doors and hatches in watertight subdivision boundaries

4.1 General

4.1.1 Watertight doors and hatches are to be designed in accordance with a recognised Standard. They are to be manufactured under LR Survey and surveyed during installation. They are to be tested in accordance with the LR survey procedures, operated under working conditions and tested in place, *see* Pt 6, Ch 6.

4.1.2 Doors and hatches are to be of equivalent strength to the unpierced subdivision. They are to be approved for the maximum head of water indicated by the approved damage stability calculations.

4.1.3 Where watertight doors of the sliding type are permitted to be fitted by the Naval Administration, they are to be capable of being operated by efficient hand operated gear, both at the door itself and from an accessible position above the vertical limit of watertight integrity. Means are to be provided at the remote operating position to indicate whether the door is open or closed. The time necessary for the complete closure of the door, when operating by hand gear, is not to exceed 90 seconds with the ship in the upright position.

4.1.4 Power operated doors are to be capable of being opened and closed locally by both power and efficient hand operated mechanisms in accordance with 4.1.3.

4.1.5 Indicators are to be provided on the bridge, ship command centre or operations room showing whether power operated watertight doors and hatches are open or closed, *see* Vol 2, Pt 10, Ch 1,19.

4.1.6 Where manually operated hinged watertight doors are fitted, a suitable procedural system is to be implemented to ensure that such doors remain closed when at sea unless specific authorisation is sought.

4.1.7 Watertight doors and hatches are to be capable of being operated from both sides of the watertight division except for access to high security areas such as magazines or to prevent access from open decks as agreed with the Naval Administration.

4.1.8 As a minimum, sliding watertight doors are to be capable of being operated when the ship is listed up to 15° either way. The Naval Administration may require that the doors are operable up to the angles of heel determined by the damage stability calculations. Consideration is also to be given to the forces which may act on either side of the door as may be experienced when water is flowing through the opening, applying a static head equivalent to a water height of at least 1 m above the sill on the centreline of the door.

Existing Sections 4 *to* 10 *have been renumbered* 5 *to* 11.

■ *Section ~~8~~ 9*
Bulwarks, guard rails, raised walkways and other means for the protection of crew and embarked personnel

~~8.1~~ 9.1 General requirements

~~*8.1.1*~~ *9.1.1* Bulwarks or guard rails are to be provided at the boundaries of exposed decks. Bulwarks or guard rails are to be not less than 1,0 m in height measured above sheathing, and are to be constructed as required by this Section. Consideration will be given to cases where this height would interfere with the normal operation of the ship. Guard rails provided around aircraft operating areas may be of the type which drop outwards with nets to the satisfaction of the Naval ~~Authority~~ Administration, provided access is restricted to essential personnel. Where bulwarks or rails are undesirable, e.g., for radar signature purposes, alternative equivalent arrangements will ~~require to be provided.~~ be required.

~~8.1.2~~ *9.1.2* The freeing arrangements in bulwarks are to be in accordance with ~~8.3~~ 9.3.

Existing paragraph 8.1.3 *has been renumbered* 9.1.3.

~~8.1.4 Raised walkways which form evacuation routes or assembly areas, or provide for the transfer of heavy equipment, stores or munitions are to comply with the requirements of 8.5.~~

Existing paragraphs 8.1.5 *and* 8.1.6 *have been renumbered* 9.1.4 *and* 9.1.5.

9.1.6 Stowage is to be provided for portable stanchions and stays, sited adjacent to where they are to be used.

~~8.1.7~~ *9.1.7* Where necessary for the normal operation of the ship, steel wire ropes may be accepted in lieu of guard rails. Wires are to be made taut by means of turnbuckles. Chains are only permitted in short lengths in way of access openings.

~~8.1.8~~ *9.1.8* ~~Satisfactory means,~~ Satisfactory means for safe passage of personnel, in the form of guard rails, life-lines, handrails, gangways, underdeck passageways or other equivalent arrangements, are to be provided for the protection of the crew and embarked personnel in getting to and from their quarters, the machinery space and all other ~~parts used in the necessary~~ spaces used in the essential operation of the ship. ~~Where a well lighted and ventilated underdeck passage (clear opening 0,8 m wide, 2 m high) is provided it is to be as close as practicable to the weather deck, connecting and providing access to the following locations:~~

- ~~between superstructures;~~
- ~~from forward and aft superstructures to the fore end and aft end respectively.~~

~~8.1.9 Gangways or walkways may be omitted on ships assigned a service area notation **SA4**.~~

9.1.9 A well illuminated and ventilated underdeck passage (with a clear opening at least 0,8 m in width and 2 m in height) is to be provided as close as practicable to the weatherdeck, connecting and providing access to the following locations:

- between superstructures;
- from the forwardmost superstructure to the forward end of the vessel;
- from the aftmost superstructure to the aft end of the vessel.

9.1.10 To assist movement in adverse weather conditions, handrails are to be fitted to bulkheads in passageways and superstructure on weatherdecks.

9.1.11 Handrails are to be fitted at a height of not less than 1 m, measured from the top of the rail to the deck. Handrails should be made of steel tubes of 42,4 mm outside diameter, with a wall thickness of at least 2,6 mm.

9.1.12 Handrails are to be secured by way of supports that are not to be spaced more than 1,5 m apart. The supports are to hold the rails not less than 50 mm from the bulkhead, measured from the inside of the rail to the bulkhead.

9.1.13 Raised walkways which form escape routes or assembly areas, or provide for the transfer of heavy equipment, stores or munitions, are to comply with the requirements of 9.5.

9.1.14 For additional requirements for the safety of embarked persons, *see* Vol 3, Pt 1, Ch 6,2.4.

Volume 1, Part 3, Chapter 5

Anchoring, Mooring, Towing, Berthing, Launching, Recovery and Docking

Effective date 1 January 2014

■ *Section 10* Launch and recovery, berthing and ~~docking~~ dry-docking arrangements

10.2 Dry-docking arrangements

10.2.1 Dry-docking arrangements are not explicitly covered in the Rules, *see* Ch 1,1.4.1. These requirements are intended to address the loads imposed on the vessel during dry-docking.

10.3 Dry-docking plan

10.3.1 In accordance with Pt 6, Ch 1,2.2.6 a dry-docking plan is to be submitted as a supporting document. Consideration should be given throughout the design of a vessel to producing a dry-docking plan. The dry-docking plan should include, but not be limited to, the following information:

- The permissible locations of dock furniture;
- Maintenance and withdrawal envelopes;
- The arrangement of underwater fittings and openings.

The dry-docking plan should take into account multiple likely docking arrangements for maintenance and through-life support.

~~**10.2 Docking loads**~~

10.4 Dry-docking loads

~~*10.2.1*~~ *10.4.1* ~~Docking~~ Dry-docking a ship on blocks potentially imposes high vertical loads on the keel. For ships where the Rule length, L_R, exceeds 50 m, the strength of the keel and ~~double~~ bottom structure is to be assessed. ~~Methods, other than the simplified method or direct calculation method described here, for demonstrating that the strength of the structure is ensured against the loads imposed by docking may be considered and are to be agreed with LR.~~

10.4.2 Methods, other than those described here, for demonstrating that the strength of the keel and bottom structure is sufficient to withstand the loads imposed by dry-docking may be considered. Such methods are to be agreed with LR prior to the analysis being conducted.

10.4.3 For each dry-docking arrangement the stress and buckling behaviour of the bottom structure in way of the proposed dock blocks is to be assessed. The acceptance criteria given in Table 5.10.1 are not to be exceeded.

10.4.4 Where it is anticipated that there will be more than one typical dry-docking loading condition, the bottom structure is to be assessed for a representative number of loading conditions.

~~*10.2.2* It is recommended that for ships of fine hull form or where Woh, as defined in 10.2.6, at any block becomes negative the docking load distribution is derived by direct calculation using a full ship finite element model constructed generally in accordance with the ShipRight SDA procedure for passenger ships. The model is to be supported on grounded spring elements representing the dock block arrangement as given in the docking plan. Calculations should be carried out for a representative number of docking conditions. The spring element stiffness in the model should be representative of the block and capping stiffness. An assessment of the result should be carried out to ascertain the sensitivity of the structural response to the spring constant used. Under the application of the loads the acceptance criteria given in Table 5.10.1 are not to be exceeded. The appropriate buckling criteria of Pt 6, Ch 2,3 are to be applied using the minimum buckling factor given in Table 5.10.1.~~

10.4.5 It is recommended that the block load distribution be derived by direct calculation using a full ship finite element model, constructed generally in accordance with the ShipRight SDA procedure for passenger ships. Where the dry-docking load distribution, F_{DL}, as defined in 10.4.6 becomes negative at any point, the block load distribution is to be derived by such direct calculations. The model is to be supported on grounded spring elements representing the proposed dry-docking arrangements. The spring element stiffness in the model should be representative of the combined block and capping stiffness. A sensitivity assessment should be carried out to ascertain the structural response to the spring constant used.

~~*10.2.3* For full bodied ships or where a more detailed assessment is impractical a simplified method may be used where a line load at the keel equal to the following equation is distributed equally over blocks in that section. For block spacing where a number of blocks are spaced equally between the transverse bulkheads, the load on the keel can be taken as a distributed line load.~~

~~$$F_{DL} = \frac{g\, W_c\, f_{bhd}}{L_c} \text{ kN/m}$$~~

where

~~W_c = weight of the length between main transverse bulkheads in tonnes~~

~~f_{bhd} = correction factor to be applied within 1 frame of transverse bulkheads~~

~~= 2, within one frame of transverse bulkheads~~

~~= 1, elsewhere~~

~~g = acceleration due to gravity, 9,81 m/s²~~

~~L_c = distance between main transverse bulkheads, in metres.~~

10.4.6 The following equation may be used to calculate the dry-docking load distribution, F_{DL}, between main transverse bulkheads acting on a keel block:

$$F_{DL} = \frac{W_c\, f_{bhd}}{(n-1)\, L_{kb}} + W_{oh} \text{ kN/m}$$

where

F_{DL} = dry-docking load distribution acting on a keel block, in kN/m

W_c = section weight between main transverse bulkheads, in kN

f_{bhd} = 2, for the keel blocks located adjacent to a main transverse bulkhead

= 1, elsewhere

n = number of keel blocks between main transverse bulkheads

L_{kb} = nominal keel block length, in metres

W_{oh} = weight increase per unit length due to an overhang, if applicable, *see* 10.4.8.

10.4.7 For ships with an after end cut-up or significant rake of stem where there is considerable overhang, it may be assumed that the increase in load due to the overhang will extend a distance equal to twice the length of the overhang and will be distributed parabolically, *see* Fig. 5.10.1.

~~*10.2.4* For ships with an after cut up or a significant rake of stem where there is a considerable overhang increasing the load at the after or fore end of the keel. It may be assumed that the increase in load due to the overhang will extend forward from the cut up a distance equal to twice the length of the overhang and will be distributed parabolically, *see* Fig. 5.10.1.~~

~~*10.2.5* When an overlap of the forward and aft overhang correction curves occurs both curves are to be included in the total line load over a section. This will increase the possibility that blocks amidships will become unloaded, *see* 10.2.2.~~

~~*10.2.6* It may then be shown that the mass per unit length to be added at each dock block at forward of the cut-up is given by the following equation:~~

$$~~W_{oh} = \frac{3g\, W_o\, k_{dl}}{4L_o^2}~~ \text{ kN/m}$$

~~where~~

$$~~k_{dl} = \frac{(2L_e + 3L_G)\left(\frac{x}{L_o}\right)^2 - 2\,(3L_e + 4L_G)\left(\frac{x}{L_o}\right) + 4\,(L_e + L_G)}{}~~$$

~~x = distance forward of after cut-up, in metres~~
~~W_o = weight of overhang, in tonnes~~
~~W_e = weight of section between main transverse bulkheads, in tonnes~~
~~L_o = length of overhang, in metres~~
~~L_e = length between main transverse bulkheads~~
~~L_G = position of centre of gravity aft of after cut-up.~~

10.4.8 The increase in weight per unit length to be added due to an overhang, *see* 10.4.6, is to be determined from the following equation:

$$W_{oh} = \frac{W_o\, k_{dl}}{L_o} \text{ kN/m}$$

where

W_{oh} = additional weight per unit length due to overhang, in kN/m
W_o = weight of overhang, in kN

$$k_{dl} = \left(1{,}5 + 2{,}25\,\frac{L_G}{L_o}\right)\left(\frac{x}{L_o}\right)^2 - \left(4{,}5 + 6\,\frac{L_G}{L_o}\right)\left(\frac{x}{L_o}\right) + 3\,\frac{L_G}{L_o} + 3$$

x = distance from the overhang, measured in metres from the mid-point of the last keel block
L_o = length of overhang, in metres
L_G = horizontal distance measured from the mid-point of the last keel block to the centre of gravity of the overhang, in metres.

10.4.9 When an overlap of the forward and aft overhang correction curves occurs, both curves are to be included. This will increase the possibility that blocks amidships will become unloaded, *see* 10.4.5.

~~*10.2.7* Unusual docking procedures or arrangements will be specially considered.~~

Existing sub-Section 10.3 *has been renumbered* 10.5.

Volume 1, Part 3, Chapter 6

Structural Procedures for the Design, Construction and Lifetime Care of Ships

Effective date 1 January 2014

■ *Section 7* ~~Protective Coating in Water Ballast Tanks~~ Protective Coatings

7.1 General

7.1.1 It is recommended for all ship types that all salt-water spaces having boundaries formed by the hull envelope have a corrosion protection coating applied.

7.1.2 It is recommended that consideration be given to the effective corrosion protection of other internal spaces and external areas by the use of a suitable protective coating system.

~~7.1~~ 7.2 Protective Coating in Water Ballast Tanks – PCWBT

~~*7.1.1* It is recommended for all ship types that all salt water spaces having boundaries formed by the hull envelope are to have a corrosion protection coating applied.~~

~~*7.1.2*~~ *7.2.1* If the Owner so wishes, a notation, **PCWBT** 'Protective Coating in Water Ballast Tanks', will be entered in the Register Book to indicate that the ship's water ballast tanks are coated and that the coating remains efficient and well maintained. If the coatings have broken down, particularly at more critical areas, and no effort is being made to maintain the coatings, then this notation will be placed in parentheses, i.e., **(PCWBT)**. In either case the date of the last survey will be placed in parentheses after the notation.

7.3 ShipRight ACS notations

7.3.1 The Anti-Corrosion System notation, **ShipRight ACS (B)**, will be assigned to Naval vessels, at the Owner's request, when protective coating systems have been applied to water ballast tanks during construction, in accordance with the *ShipRight Anti-Corrosion System Notations for Naval Ships procedure.*

7.3.2 The notation **ShipRight ACS (B)** indicates that the protective coating systems for water ballast tanks has been applied in accordance with IMO regulations; however, it is only available to new-build ships. The **PCWBT** notation may be applied to existing ships when in compliance with the applicable provisions.

Volume 1, Part 5, Chapter 1
General

Effective date 1 January 2014

■ *Section 2*
Direct calculations

~~**2.2 Naval Ship Rules Software**~~

~~*2.2.1 LR's direct calculation procedures and facilities are summarised in a publication entitled the LR Software Guide.*~~

Existing sub-Section 2.3 *has been renumbered* 2.2.

Volume 1, Part 5, Chapter 3
Local Design Loads

Effective date 1 January 2014

■ *Section 2*
Motion response

2.1 General

2.1.1 The motions of the ship are to be considered in deriving the ~~dynamic~~ loads acting on the ship. The formulae given in this Section may be utilised or ship motion design values may be derived by direct calculation methods or model testing.

~~*2.1.2 For the assessment of mass inertial forces acting on structure the following combinations of static and dynamic forces are to be considered:*~~

~~(a) Rolling motion only:~~
~~Static roll + dynamic roll + dynamic heave (at roll angle)~~

~~(b) Pitching motion only:~~
~~Static pitch + dynamic pitch + dynamic heave (at pitch angle)~~

~~(c) Combined motion:~~
~~Static combined +0,8 (dynamic roll + dynamic pitch)~~

~~Full details of the load cases applied are to be submitted for approval.~~

Volume 1, Part 6, Chapter 2
Design Tools

Effective date 1 January 2014

■ *Section 3*
Buckling

3.10 Shear buckling of girder webs

(*Part only shown*)

Table 2.3.2 Plate panel buckling requirements

	Stress field	Buckling Interaction formula	
(e)	bi-axial compressive loads plus shear loads	~~$\dfrac{0{,}625\left(1+\dfrac{0{,}6}{A_R}\right)\left(\dfrac{\sigma_{dy}}{\sigma_{cy}}\right)}{\left(1-0{,}625\right)\left(\dfrac{\sigma_{dx}}{\sigma_{cx}}\right)}+\dfrac{\left(\dfrac{\tau_d}{\tau_c}\right)^2}{1-\left(\dfrac{\sigma_{dx}}{\sigma_{cx}}\right)}\le 1$~~ $\dfrac{0{,}625\left(1+\dfrac{0{,}6}{A_R}\right)\left(\dfrac{\sigma_{dy}}{\sigma_{cy}}\right)}{1-0{,}625\left(\dfrac{\sigma_{dx}}{\sigma_{cx}}\right)}+\dfrac{\left(\dfrac{\tau_d}{\tau_c}\right)^2}{1-\left(\dfrac{\sigma_{dx}}{\sigma_{cx}}\right)}\le 1$	

Volume 1, Part 6, Chapter 6
Material and Welding Requirements

Effective date 1 January 2014

■ *Section 2*
Materials

2.2 Grade of steel

~~*2.2.2 In order to distinguish between the material grade requirements for different hull members, material classes are assigned as given in Table 6.2.1 and Fig. 6.2.1. Steel grades are not to be lower than those corresponding to the material classes as given in Table 6.2.2.*~~

2.2.2 In order to distinguish between the material grade requirements for different hull members at varying locations along the ship, material classes are assigned, as shown in Table 6.2.1. For each class, depending on thickness, the material grade requirements are not to be lower than those given in Table 6.2.2.

2.4 Ships operating in cold weather conditions

~~*2.4.1 Unless otherwise specified, all ships designed for sea area SA1 and other ships intended to operate for extended periods in cold weather conditions, the minimum toughness requirements for the material of the hull structure are specified in Fig. 6.2.2 and Table 6.2.5. The requirements are based on a design air temperature of –30°C. Where an alternative design air temperature is required, the materials selected are to be in accordance with Pt 3, Ch 2,3 of the Rules and Regulations for the Classification of Ships (hereinafter referred to as the Rules for Ships). In the absence of specific information, the air temperature should be taken as:*~~

- ~~*for Ice class 1C first year strengthened ships not higher than –30°C,*~~
- ~~*for Ice class 1AS, 1A and 1B first year ice strengthened ships not higher than –40°C,*~~
- ~~*for multi-year ice strengthened ice breaking ships not higher than –50°C.*~~

2.4.1 The material class and minimum grade requirements specified in Table 6.2.1 and Table 6.2.2 are applicable for normal service, which assumes the navigation to areas where the lowest mean daily average air temperature is not less than –10°C.

~~*2.4.2* Cold weather is defined as that which will cause the temperature to fall below 0ºC.~~

2.4.2 Unless otherwise specified, all ships designed for sea area **SA1** and other ships intended to operate for extended periods in cold weather conditions, the material class and minimum grade requirements dependent on thickness are to be in accordance with Table 6.2.5 and Table 6.2.6. The requirements are based on a lowest mean daily average design air temperature of –30°C. Where an alternative design air temperature is required, the choice of material grades will be specially considered, *see also The Provisional Rules for the Winterisation of Ships*.

~~*2.4.3*~~ *2.4.3* ~~In addition to the requirements of Fig. 6.2.2 all~~ All bulwarks, spurn-waters, unlagged gas turbine intake structures, side screens, tie down points, etc., are to be constructed of steel of equivalent toughness to that of the material to which they are attached.

~~*2.4.4* Plating at the corners of deck openings, superstructure ends and other structural discontinuity is to be specially considered. The requirements of Class III are to be applied in position where high local stresses may occur but the material is not to be less than Grade E.~~

~~*2.4.5* In ships where L_R is >250 m, the shear stringer plate is not to be less than Grade E or EH from $0,3L_R$ to $0,7L_R$.~~

~~*2.4.6*~~ *2.4.4* Steel grades for rudder horn and stem (including the adjacent strake of shell plating), are given in Table 6.2.7. The steel grades of internal members attached to these items are to be of the same grade (or equivalent) with due account taken of difference in thickness.

2.4.5 For non-exposed structures and structures below the Cold Waterline, the material grades are not to be lower than those given in Table 6.2.1.

2.4.6 Structure attached to and within a distance of 2,0 m within unheated spaces and 0,75 m for heated spaces of the exposed boundary plating is to be of the same material grade as that of the exposed plating, but the grade may be adjusted depending on the material thickness of the attached structure.

~~*2.4.7* In general, longitudinal frames and outboard strakes of horizontal stringers, transverse frames and web plating are to be of the same steel grade as the plating to which they are connected, but the grade may be adjusted to take account of difference in thickness.~~

~~*2.4.8* The structure of internal spaces not included in Table 6.2.1 are to be in accordance with Table 6.2.6.~~

2.6 Paints and coatings

2.6.2 At the Owner's request, the **ShipRight ACS (B)** notation may be assigned to a vessel to indicate that paints and protective coatings have been applied to water ballast tanks in accordance with the *ShipRight Anti-Corrosion System Notations for Naval Ships* procedure during construction, *see* Pt 1, Ch 2,3.9.

Existing paragraphs 2.6.2 *and* 2.6.3 *have been renumbered* 2.6.3 *and* 2.6.4.

~~*2.6.4*~~ *2.6.5* Details and recommendations regarding the coating of salt-water ballast spaces are given in LR's *List of Paints, Resins, Reinforcements and Associated Materials*~~,~~ and the *ShipRight Anti-Corrosion System Notation for Naval Ships procedure.*

Existing paragraphs 2.6.5 *to* 2.6.12 *have been renumbered* 2.6.6 *to* 2.6.13.

(*Part only shown*)

Table 6.2.1 ~~Material classes and grades~~ Material classes and grades in general

Structural member category	Material class/ Minimum grade
SECONDARY	
A1. Longitudinal bulkhead strakes, other than belonging to the Primary category A2. Deck plating exposed to weather, other than that belonging to the Primary or Special category A3. Side plating	Class I within $0,4L_R$ amidships ~~Class 0~~ Grade A/AH outside $0,4L_R$ amidships
PRIMARY	
B1. Bottom plating, including keel plate B2. Strength deck plating, excluding that belonging to the Special category~~, see Note 7~~ B3. Continuous longitudinal members above strength deck B4. Uppermost strake in longitudinal bulkhead	Class II within $0,4L_R$ amidships ~~Class 0~~ Grade A/AH outside $0,4L_R$ amidships
SPECIAL	
C3. Strength deck plating at corners of large hatch openings	Class III within ~~0,4~~ $0,6L_R$ amidships Class II outside $0,6L_R$ amidships
~~SHIPS WITH LENGTH EXCEEDING 150 m AND SINGLE STRENGTH DECK~~ ADDITIONAL REQUIREMENTS FOR SINGLE STRENGTH DECK SHIPS OF LENGTH GREATER THAN 150 m	
~~SHIPS WITH LENGTH EXCEEDING 250 m~~ ADDITIONAL REQUIREMENTS FOR SHIPS OF LENGTH GREATER THAN 250 m	
E2. Bilge strake, *see* Note 1	Grade D/DH ~~over its entire length~~ within $0,6L_R$ amidships

NOTES

1. Single strakes required to be of Class III or of Grade E/EH and within $0,4L_R$ amidships are to have breadths not less than $800 + 5L_R$ mm, but need not be greater than 1800 mm, unless limited by the geometry of the ship's design.

~~2. In ships with breadth exceeding 70 m, at least three deck strakes in board of the sheerstrake or rounded gunwale, including the stringer plate at the strength deck, are to be of Class III within $0,3L_R$ to $0,7L_R$.~~

~~3. In ships with a double bottom over the full breadth and with length less than 150 m, bilge strake may be of Class II within $0,3L_R$ to $0,7L_R$.~~

~~4.~~ 2. For strength members not mentioned, Grade A/AH may be generally used.

~~5.~~ 3. Steel grade is to correspond to the as-fitted thickness.

~~6.~~ 4. Plating materials for sternframes, rudders, rudder horns and shaft brackets are, in general, not to be of lower grades than corresponding to Class II. For rudder and rudder body plates subjected to stress concentrations (e.g., in way of lower support of semi-spade rudders or at upper part of spade rudders) Class III is to be applied.

~~7. Plating at corners of large hatch openings is to be of Class III within $0,5L_R$ amidships and Class I elsewhere.~~

~~8.~~ 5. RAS seating and support structure are to be of Grade D/DH for $t \leq 20$ mm and Grade E/EH for $t > 20$ mm. For ships operating in cold weather RAS seating and support structure are to be of Grade E/EH.

~~9.~~ 6. Corner inserts in way of complex openings such as for lifts and side doors which may impinge on the deck plating or stringer plate are to be of Grade D/DH for $t \leq 20$ mm and Grade E/EH for $t > 20$ mm.

~~10.~~ 7. The material class used for reinforcement and the quality of material (i.e., whether mild or higher tensile steel) used for welded attachments, such as waterway bars and bilge keels, is to be similar to that of the hull envelope plating in way. Where attachments are made to rounded gunwale plates, special consideration will be given to the required grade of steel, taking account of the intended structural arrangements and attachment details.

~~11.~~ 8. The material class for deck plating, ~~sheer strake~~ sheerstrake and upper strake of longitudinal bulkhead within ~~0,4*L*~~ $0,4L_R$ amidships is also to be applied at structural breaks of the superstructure, irrespective of position.

~~12.~~ 9. Engine seat top plates outside ~~0,6*L*~~ $0,6L_R$ amidships may be Grade A/AH. Steel grade requirement for top plates within ~~0,6*L*~~ $0,6L_R$ amidships will be specially considered.

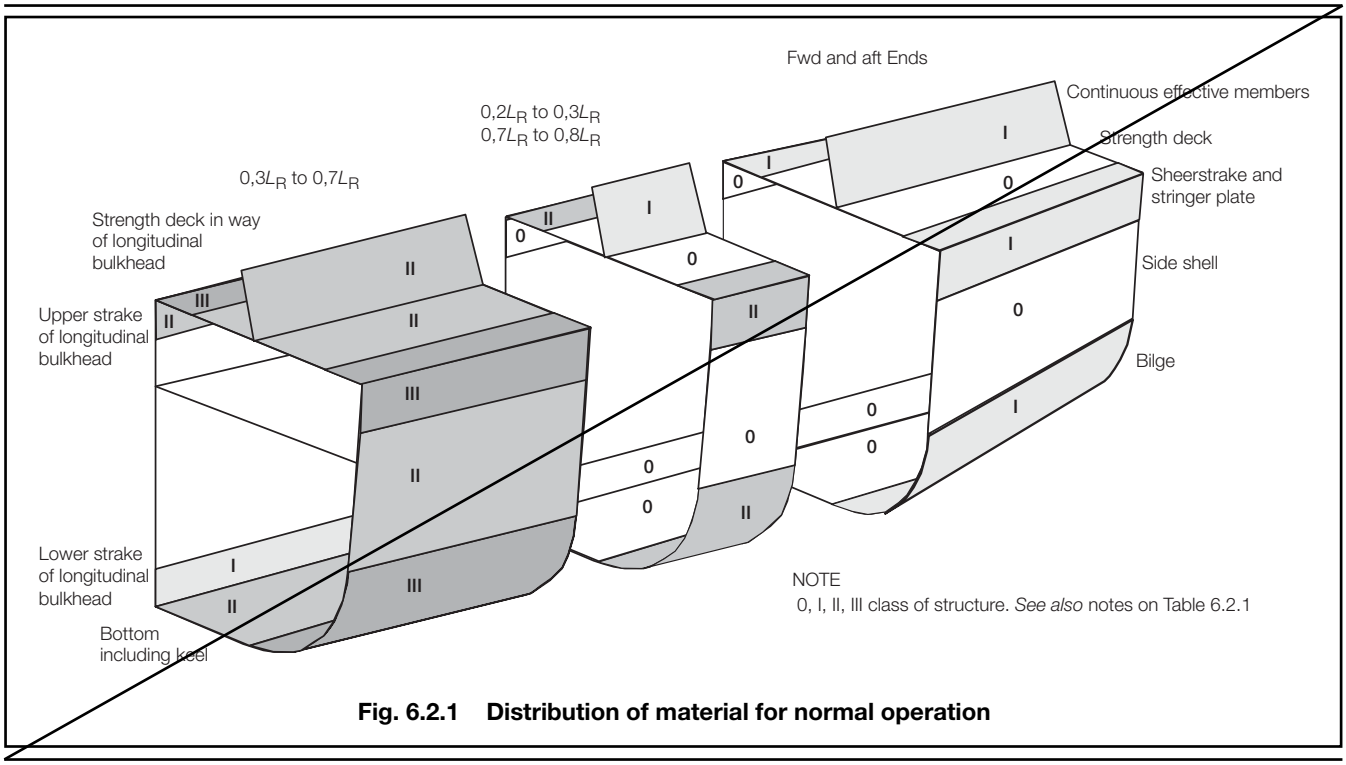

Fig. 6.2.1 Distribution of material for normal operation

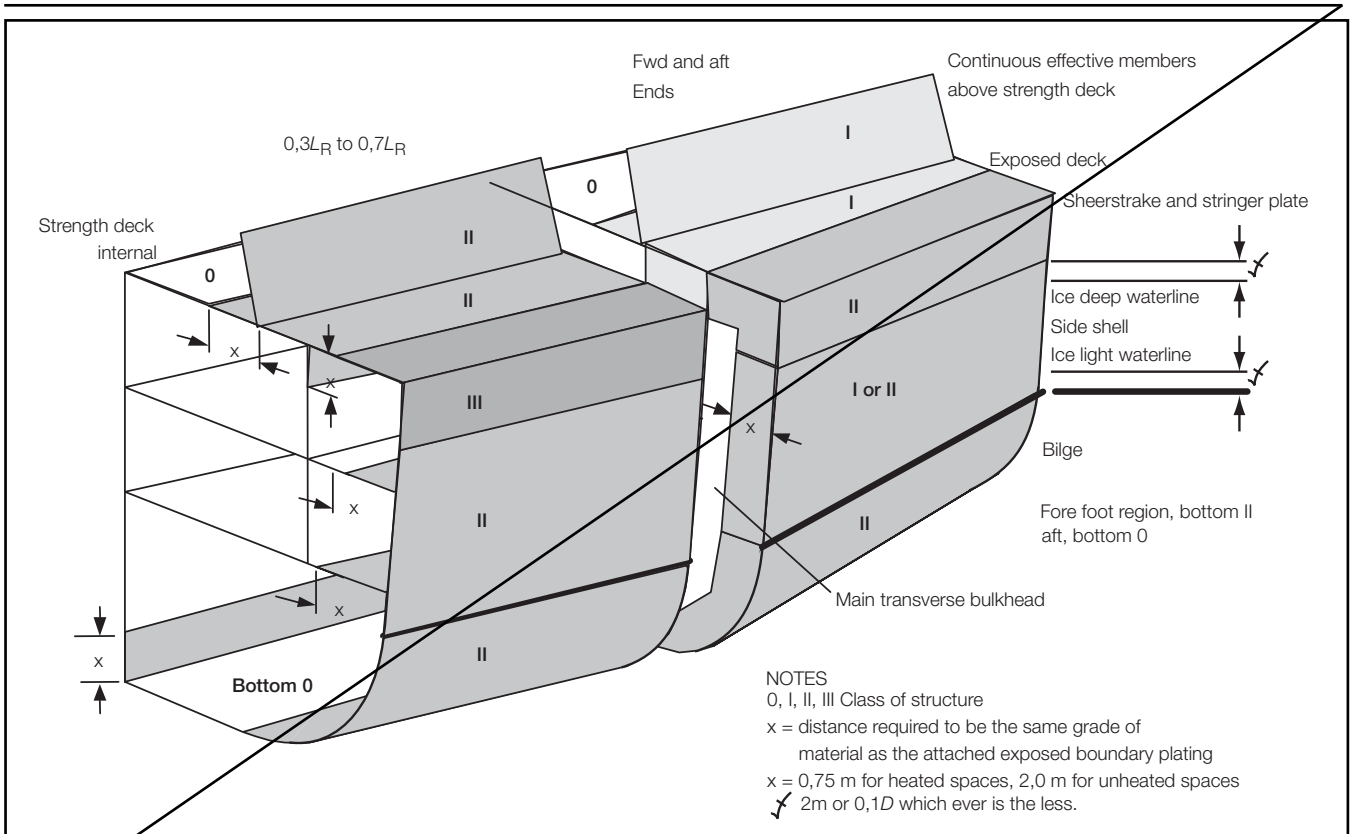

Fig. 6.2.2 Distribution of material for cold weather classes

~~Table 6.2.2 Steel grades for normal operation~~

Thickness, in mm	Class							
	O		I		II		III	
≤10	A	AH	A	AH	A	AH	A	AH
10–15	A	AH	A	AH	A	AH	A	AH
15–20	A	AH	A	AH	A	AH	B	AH
20–25	A	AH	A	AH	B	AH	D	DH
25–30	A	AH	A	AH	D	DH	E	EH
30–35	A	AH	B	AH	D	DH	E	EH
35–40	A	AH	B	AH	D	DH	E	EH
40–45	B	AH	D	DH	E	EH	E	EH
45–50	B	AH	D	DH	E	EH	E	EH

Table 6.2.2 Steel grades for normal operation

Thickness, in mm	Material Class					
	I		II		III	
	Mild steel	H.T. steel	Mild steel	H.T. steel	Mild steel	H.T. steel
≤10	A	AH	A	AH	A	AH
10–15	A	AH	A	AH	A	AH
15–20	A	AH	A	AH	B	AH
20–25	A	AH	B	AH	D	DH
25–30	A	AH	D	DH	D	DH
30–35	B	AH	D	DH	E	EH
35–40	B	AH	D	DH	E	EH
40–45	D	DH	E	EH	E	EH
45–50	D	DH	E	EH	E	EH

~~Table 6.2.5 Steel grades for cold weather operation~~

Thickness, in mm	Class							
	O		I		II		III	
≤10	B	AH	B	AH	D	DH	D	DH
10–15	B	AH	D	DH	D	DH	E	EH
15–20	B	AH	D	DH	D	DH	E	EH
20–25	B	AH	D	DH	E	EH	E	EH
25–30	B	AH	D	DH	E	EH	E	EH
30–35	B	AH	D	DH	E	EH	F	FH
35–40	B	AH	E	EH	E	EH	F	FH
40–45	B	AH	E	EH	F	FH	F	FH
45–50	B	AH	E	EH	F	FH	F	FH

Table 6.2.5 Material classes and grades for structures exposed to low temperatures

Structural member category	Material class
SECONDARY	
A1. Deck plating exposed to weather, other than that belonging to the Primary or Special category A2. Side plating above the Cold Waterline (CWL), *see* Note 4 A3. Transverse bulkheads above CWL, *see* Note 4	Class I
PRIMARY	
B1. Strength deck plating, excluding that belonging to the Special category, *see* Note 1 B2. Continuous longitudinal members above strength deck B3. Longitudinal bulkhead above CWL, *see* Note 4	Class II within $0,4L_R$ amidships Class I outside $0,4L_R$ amidships
SPECIAL	
C1. Sheerstrake (or rounded gunwale) and stringer plate at strength deck, *see* Note 2 C2. Deck strake at longitudinal bulkhead, *see* Note 3	Class III within $0,4L_R$ amidships Class II outside $0,4L_R$ amidships

NOTES
1. Plating at the corners of deck openings, superstructure ends and other structural discontinuity is to be specially considered. The requirements of Class III are to be applied in positions where high local stresses may occur but the material is not to be less than Grade E/EH.
2. Not to be less than Grade E/EH within $0,4L_R$ amidships in ships with length exceeding 250 m.
3. In ships with breadth exceeding 70 m at least three deck strakes are to be Class III.
4. The Cold Waterline (CWL) is to be taken as 0,3 m below the minimum design Ballast Waterline (BWL).

~~**Table 6.2.6 Cold weather requirements for internal structure (heated and unheated)**~~

Structure in permanently heated spaces		
Location of structure	Structure	Requirement
Above Ice Light Waterline attached to exposed boundary stiffening	Lagged secondary and primary	As the exposed boundary
Above Ice Light Waterline attached to exposed boundary stiffening	Unlagged secondary and primary	Class O
Above Ice Light Waterline connected to an exposed boundary	Deck and bulkhead plating	As the exposed boundary
Below Ice Light Waterline adjacent to unheated fluid	Deck and bulkhead plating	Class O
Structure in all other spaces		
Location of space	Structure	Requirement
Above Ice Light Waterline	All	As exposed boundary
Below Ice Light Waterline with exposed boundary	All	As exposed boundary
Below Ice Light Waterline with no exposed boundary	All	Class O
NOTES Permanently heated spaces are those in which the internal air is maintained at a temperature above 15ºC. The exposed boundary is all that which is in contact with the external air or water including superstructure deckhouses and tanks.		

Table 6.2.6 Steel grades for cold weather operation

Thickness, in mm	Material Class					
	I		II		III	
	Mild steel	H.T. steel	Mild steel	H.T. steel	Mild steel	H.T. steel
≤10	B	AH	D	DH	D	DH
10–15	D	DH	D	DH	E	EH
15–20	D	DH	D	DH	E	EH
20–25	D	DH	E	EH	E	EH
25–30	D	DH	E	EH	E	EH
30–35	D	DH	E	EH	—	FH
35–40	E	EH	E	EH	—	FH
40–45	E	EH	—	FH	—	FH
45–50	E	EH	—	FH	—	FH

Table 6.2.7 Steel grades for rudder horn, shaft brackets and stem for ships intended to navigate in Arctic or Antarctic conditions

Item	Condition	Construction	Steel grade[2][3]	
			f < 25(1)	f ≥ 25(1)
Rudder horn	Fully immersed	Cast steel	Carbon manganese steel Grade 400	Carbon manganese steel Grade 400
		Fabricated	Grade EH	Grade EH
	Periodically immersed or exposed	Cast steel	Carbon manganese steel Grade 460	21/4 Ni steel or equivalent
		Fabricated	Grade FH	11/2 Ni steel or equivalent
Shaft brackets	Fully immersed	Cast steel	~~Normal Rule requirement~~ Special Grade	~~Normal Rule requirement~~ Special Grade
		Fabricated	~~Class O~~ Grade B/AH	~~Class O~~ Grade B/AH
	Periodically immersed or exposed	Cast steel	Carbon manganese steel Grade 400	Carbon manganese steel Grade 460
		Fabricated	Class II	Grade FH
Stem including adjacent strake of shell plating	Fully immersed	Fabricated	~~Class O~~ Grade B/AH	~~Class O~~ Grade B/AH
		Cast steel	Carbon manganese steel Grade 400	Carbon manganese steel Grade 400
	Periodically immersed or exposed	Fabricated	Class II	Class II
		Cast steel	21/4 Ni steel	21/4 Ni steel
Rudder stock		Forged	*see* Ch 5,2.4.7 of the Rules for Materials	
		Cast steel	Carbon manganese steel grade 400	

NOTES

1. $f = \sqrt{P_O \Delta} \times 10^{-3}$
   where
   P_O is the maximum propulsion shaft power, in kW, for which the machinery is classed
   Δ is displacement, in tonnes, at Ice Load Waterline or Deepest Ice Operation Waterline when floating in water of relative density of 1,0.
2. For cast steel, *see* Ch 4,7 of the Rules for Materials. The requirements for carbon manganese steel grades 400 and 460 are to include the additional compositional requirements for Special grade in accordance with Ch 4,2.2 of the Rules for Materials.
3. For C–Mn LT60 and Ni plates, *see* Ch 3,6 of the Rules for Materials.
4. For Special grade, *see* Ch 4,2.2 of the Rules for Materials.

2.10 Corrosion margin

2.10.3 ~~In the absence of a specific requirement from the Owner~~, It is the responsibility of the Owner to specify corrosion margins. Where the Owner does not specify corrosion margins, it is recommended that the following corrosion margins ~~are to~~ be applied to net scantlings calculated by these Rules, regardless of the type of corrosion protection fitted:

+0,5 mm all plating below a line, 1,0 m, above the design waterline

+2,0 mm to the keel plate.

Consideration should also be given to the addition of a corrosion margin to the following areas:

- Plating and stiffening at the lower edge of bulkheads bounding wet spaces.
- All tanks containing corrosive fluids and areas where spillage of corrosive fluids could occur.
- All uncoated structures.

Volume 2, Part 7, Chapter 2
Ship Piping Systems

Effective date 1 January 2014

■ *Section 3*
Drainage of compartments, other than machinery spaces

3.3 Fore and after peaks

3.3.4 Pipes piercing the collision bulkhead are to be fitted with suitable valves operable from above the damage control deck ~~and the valve chests are to be secured to the bulkhead inside the fore peak. The valves may be fitted on the after side of the collision bulkhead, provided that the valve is readily accessible under all service conditions~~. The valve chest is to be fitted to the aft side of the bulkhead unless the use of that space precludes the valve being readily accessible in all service conditions. In such cases the valve chest may be secured to the bulkhead inside the fore peak.

Volume 3, Part 1, Chapter 1
Ice Navigation – First Year Ice Conditions

Effective date 1 January 2014

■ *Section 2*
Hull strengthening requirements

2.1 Application

2.1.3 The ballast capacity of the ship is to be sufficient to give adequate propeller immersion in all ice navigating conditions without trimming the ship in such a manner that the actual waterline at the bow is below the ice light waterline. ~~Ballast tanks situated above the ice light waterline and adjacent to the shell, which are intended to be used in ice navigating conditions, are to be provided with heating pipes~~.

2.1.4 Fresh-water and sea-water ballast tanks, the tops of which are situated above the minimum operating condition waterline and adjacent to the shell, and which are intended to be used in ice and cold navigation conditions, are to be provided with means to prevent freezing. It is to be demonstrated that such means protect against the following:

(a) Hull structural damage caused by tank contents being pumped from beneath a layer of ice, thereby drawing a vacuum into the tank.
(b) Hull structural damage caused by ice expansion.
(c) Tank internal piping and other components being damaged by ice expansion or blockage by ice.
(d) Tank internal piping and other components being mechanically damaged by falling pieces of ice.

Heating coils are considered effective means for tanks entirely above the waterline. Heating coils, continuous circulation, air bubbling or alarms and instrumentation are considered effective means for tanks partially below the waterline. Alternatively, submission of documentary evidence of service experience, testing, calculations or a combination thereof may be used to demonstrate that the above hazards have been mitigated.

Existing paragraphs 2.1.4 *to* 2.1.8 *have been renumbered* 2.1.5 *to* 2.1.9.

Volume 3, Part 1, Chapter 6
Buoyancy, Stability and Controllability Assessment

Effective date 1 January 2014

■ *Section 1* General

1.1 Application

1.1.4 Where a stability calculation program is provided, it is to be approved in accordance with Lloyd's Register's (hereinafter referred to as LR) *Approval of Longitudinal Strength and Stability Calculation Programs*. If it is the main source of verifying compliance with stability and buoyancy requirements for conditions outside the scope of the paper format examples provided then a duplicate back-up facility is to be provided on board.

1.2 Information and plans

1.2.2 Information required to be provided on board:

(a) Plans:
- Watertight and weathertight integrity plan.

(b) Instructions:
- Instructions covering the operation of watertight doors whilst at sea.

(c) Information:
- Register of safety points, *see* 2.4.3.
- Procedure for visual inspection of safety points by Responsible Persons.
- Record of Approved Safety Equipment.
- Approved Stability Information Book.
- Information covering ship operations in heavy weather and during manoeuvring, *see* 2.5.2.
- Dry-docking information, *see* 2.5.3.
- A log of visual inspection and testing of guard rails and handrails, *see* 2.4.5.

■ *Section 2* Requirements

2.1 Watertight integrity

2.1.1 Watertight doors below the level of watertight integrity ~~which are intended to be used whilst at sea~~ are to comply with the requirements of Vol 1, Pt 3, ~~Ch 2,4.7~~ Ch 4,4 and Vol 2, Pt 10, Ch 1,19.1. ~~The door is to be clearly marked in accordance with the procedure specified in 1.2.2(b), stating that the appropriate authority is to be sought prior to operation of the door.~~ An additional requirement over and above the requirements of Vol 2, Pt 10, Ch 1,19.1 is that there is to be no single point of failure in the door control system or power operating system. For this purpose an FMEA or other satisfactory means of demonstrating compliance is to be submitted.

2.1.2 Watertight doors are to indicate to a manned central control station and other control stations as required by the Naval Administration.

2.1.3 Watertight doors are to be clearly marked in accordance with the procedure specified in 1.2.2(b), stating that the appropriate authority is to be sought prior to operation of the door.

~~*2.1.2*~~ *2.1.4* All main watertight subdivision compartments are to be fitted with means of water ingress detection. Water ingress is to be indicated at all main control stations and a suitable audible alarm is to be provided. The number and location of flooding detection sensors is to be sufficient to ensure that any substantial water ingress into a main subdivision compartment is detected under reasonable angles of trim and heel.

2.4 Safety of embarked persons

2.4.4 Guard rails and handrails are to be visually inspected and tested through life at intervals specified by the Naval Administration. The tests are to be undertaken by a Responsible Person in accordance with an appropriate standard agreed with the Naval Administration.

2.4.5 A log of visual inspections and testing is to be maintained on board the vessel and updated by the Responsible Person. Where guard rails or handrails are found to be deficient, the deficiency is to be reported to the appropriate maintainer. At Annual Survey the Surveyor is to satisfy themself that the visual inspection and testing is being undertaken and that the log is being updated appropriately.

Volume 3, Part 3, Chapter 2
Fire Protection

Effective date 1 January 2014

■ *Section 1*
Scope

1.2 Application

1.2.3 The 'Double Star endorsement' (★★) will be assigned to vessels where the arrangements on board are in accordance with stated ~~National~~ Naval Administration requirements and *ANEP-77 NATO Naval Ship Code* (NSC) – Chapter VI Fire Safety. This does not necessarily denote automatic endorsement by the ~~National~~ Naval Administration.

Volume 3, Part 3, Chapter 3
Escape and Emergency Access

Effective date 1 January 2014

■ *Section 1*
Scope

1.2 Application

1.2.3 The 'Double Star endorsement' (★★) will be assigned to vessels where the arrangements on board are in accordance with stated ~~National~~ Naval Administration requirements and *ANEP-77 NATO Naval Ship Code* (NSC) – Chapter VII Escape, Evacuation and Rescue. This does not necessarily denote automatic endorsement by the ~~National~~ Naval Administration.

Volume 3, Part 3, Chapter 4
Life-Saving and Evacuation Arrangements

Effective date 1 January 2014

■ *Section 1*
Scope

1.2 Application

1.2.3 The 'Double Star endorsement' (★★) will be assigned to vessels where the arrangements on board are in accordance with stated ~~National~~ Naval Administration requirements and *ANEP-77 NATO Naval Ship Code* (NSC) – Chapter VII Escape, Evacuation and Rescue. This does not necessarily denote automatic endorsement by the ~~National~~ Naval Administration.

Cross-references

Section numbering in brackets reflects any Section renumbering necessitated by any of the Notices that update the current version of the Rules for Naval Ships.

Volume 1, Part 1, Chapter 2

3.9.22 ***(3.9.23)*** Pt 3, Ch 4,10 *now reads* Pt 3, Ch 4,11

Volume 1, Part 3, Chapter 2

3.1.19 ***(3.1.20)*** Pt 3, Ch 4,6 *now reads* Pt 3, Ch 4,7
4.1.5 ***(4.1.6)*** 4.8 *now reads* 4.7
4.9.3 ***(4.8.3)*** Pt 3, Ch 4,6 *now reads* Pt 3, Ch 4,7
5.1.4 Ch 5,10.2 *now reads* Ch 5,10.4

Volume 1, Part 3, Chapter 4

3.1.2 5.1 *now reads* 6.1
5.4.1 ***(6.4.1)*** Table 4.5.1 *now reads* Table 4.6.1
5.6.1 ***(6.6.1)*** 5.5.1 *now reads* 6.6.1
6.2.2 ***(7.2.2)*** 6.3.1 *now reads* 7.3.1
6.2.6 ***(7.2.6)*** 6.2.1 *now reads* 7.2.1
6.3.1 ***(7.3.1)*** 6.2.2 *now reads* 7.2.2
7.1.3 ***(8.1.3)*** 7.2 *now reads* 8.2
7.1.5 ***(8.1.5)*** 7.2 *now reads* 8.2
7.1.6 ***(8.1.6)*** 7.2.6 *now reads* 8.2.6
7.2.4 ***(8.2.4)*** Fig. 4.7.1 *now reads* Fig. 4.8.1
7.2.6 ***(8.2.6)*** 7.1.3 *now reads* 8.1.3
7.1.8 *now reads* 8.1.8
7.2.8 ***(8.2.8)*** 7.1.3 *now reads* 8.1.3
7.4.1 ***(8.4.1)*** 7.2 *now reads* 8.2
8.2.3 ***(9.2.3)*** 9.2.1 *now reads* 10.2.1
8.3.5 ***(9.3.5)*** 8.3.3 *now reads* 9.3.3
8.3.8 ***(9.3.8)*** 8.3.3 *now reads* 9.3.3
Table 4.8.1 *now reads* Table 4.9.1
8.3.17 ***(9.3.17)*** 8.3.3(a) *now reads* 9.3.3(a)
8.3.8 *now reads* 9.3.8
8.5.4 ***(9.5.4)*** 8.5.3 *now reads* 9.5.3
10.2.1 ***(11.2.1)*** 10.4 *now reads* 11.4
10.4.4 ***(11.4.4)*** Table 4.10.1 *now reads* Table 4.11.1
10.5.3 ***(11.5.3)*** 10.6.2 *now reads* 11.6.2
10.8.1 ***(11.8.1)*** 10.7.2 *now reads* 11.7.2

Volume 1, Part 4, Chapter 1

6.3.3 Pt 3, Ch 2,4.10 *now reads* Pt 3, Ch 2,4.9

Volume 1, Part 4, Chapter 3

2.7.2 Pt 3, Ch 4,4 *now reads* Pt 3, Ch 4,5
2.11.2 Pt 3, Ch 3,7.1.3 *now reads*
Pt 3, Ch 3,8.1.3
3.10.10 Pt 3, Ch 4,8 *now reads* Pt 3, Ch 4,9

Volume 2, Part 7, Chapter 2

9.1.1(c) Vol 1, Pt 3, Ch 4,7.1.4 *now reads*
Vol 1, Pt 3, Ch 4,8.1.4
9.1.2 Vol 1, Pt 3, Ch 4,7.1.3 *now reads*
Vol 1, Pt 3, Ch 4,8.1.3
10.4.1 Vol 1, Pt 3, Ch 4,6.2 *now reads*
Vol 1, Pt 3, Ch 4,7.2
10.6.1 Vol 1, Pt 3, Ch 4,6.2 *now reads*
Vol 1, Pt 3, Ch 4,7.2
10.11.2 Vol 1, Pt 3, Ch 4,6.2 *now reads*
Vol 1, Pt 3, Ch 4,7.2

Volume 2, Part 7, Chapter 3

4.19.1 Vol 1, Pt 3, Ch 2,4.10 *now reads*
Vol 1, Pt 3, Ch 2,4.9

Volume 2, Part 9, Chapter 1

2.7.6 Vol 1, Pt 3, Ch 4,7 *now reads*
Vol 1, Pt 3, Ch 4,8

Volume 3, Part 1, Chapter 6

2.1.1 Vol 1, Pt 3, Ch 2,4.7 *now reads*
Vol 1, Pt 3, Ch 4,4
2.5.3 Vol 1, Pt 3, Ch 5,10.2 *now reads*
Vol 1, Pt 3, Ch 5,10.4

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